

# 2018 Virginia estuarine algal blooms: *Chesapeake Bay and Eastern Shore coastal bays*



Maryland-Virginia  
Harmful Algal  
Bloom Taskforce  
Annual Meeting  
2/19/19  
Arlington, VA



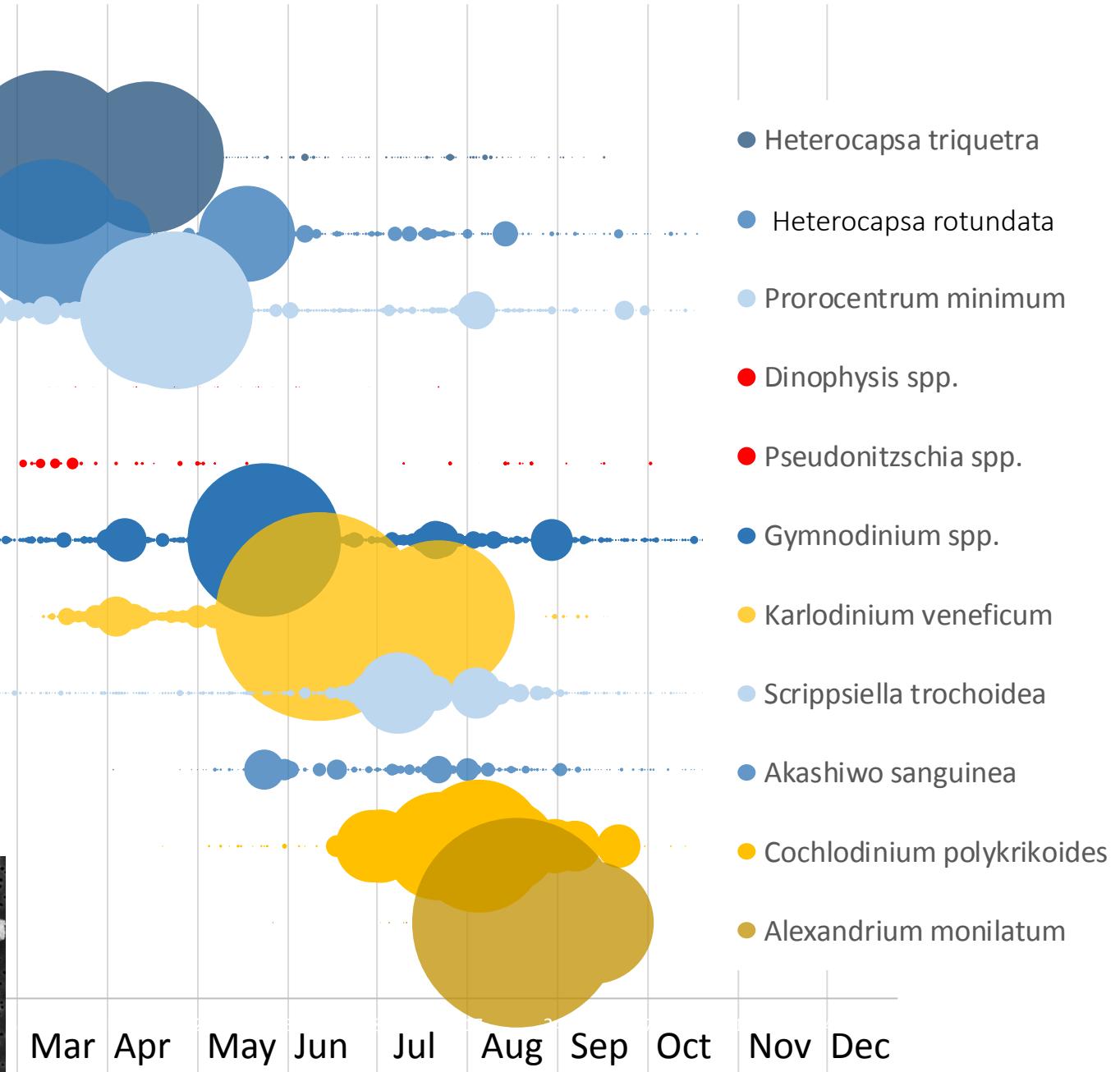
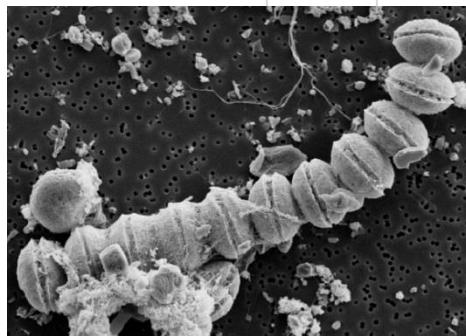
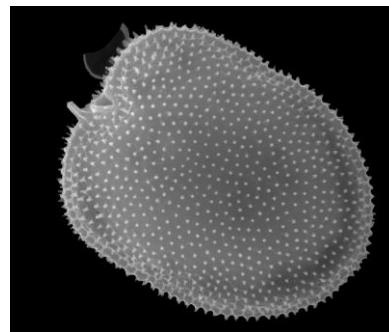
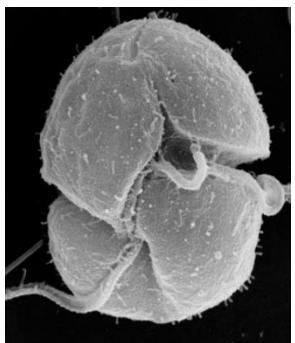
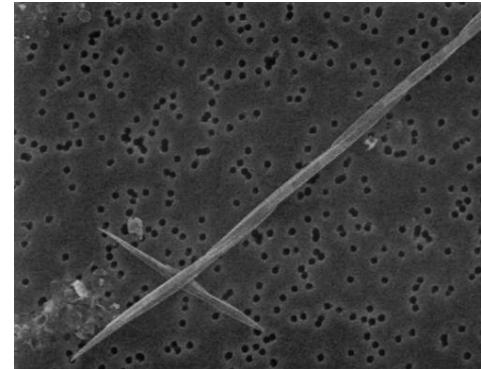
**OLD DOMINION**  
UNIVERSITY



Todd Egerton  
Division of  
Shellfish Safety

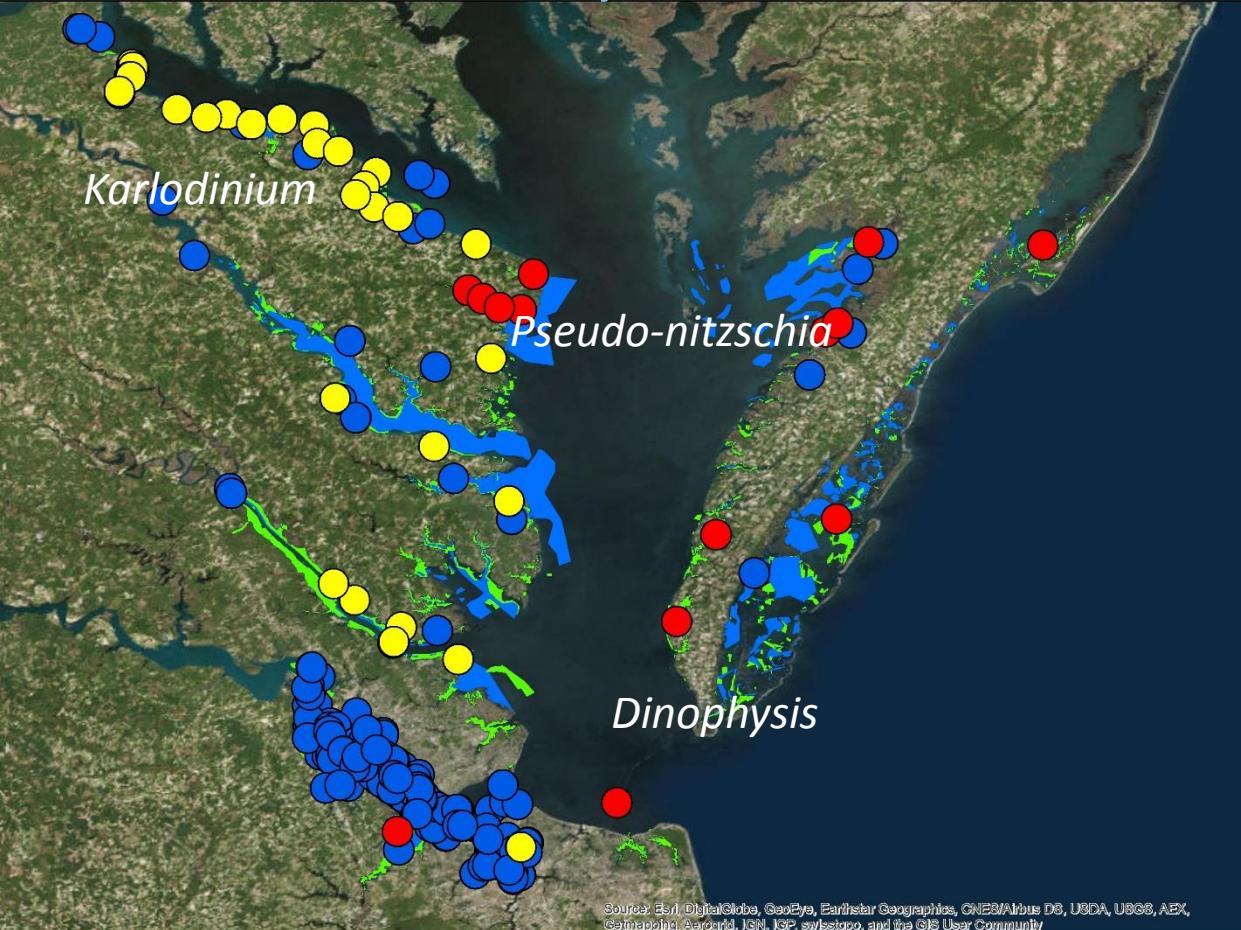
Virginia  
Department  
of Health

# Seasonal bloom succession in Virginia

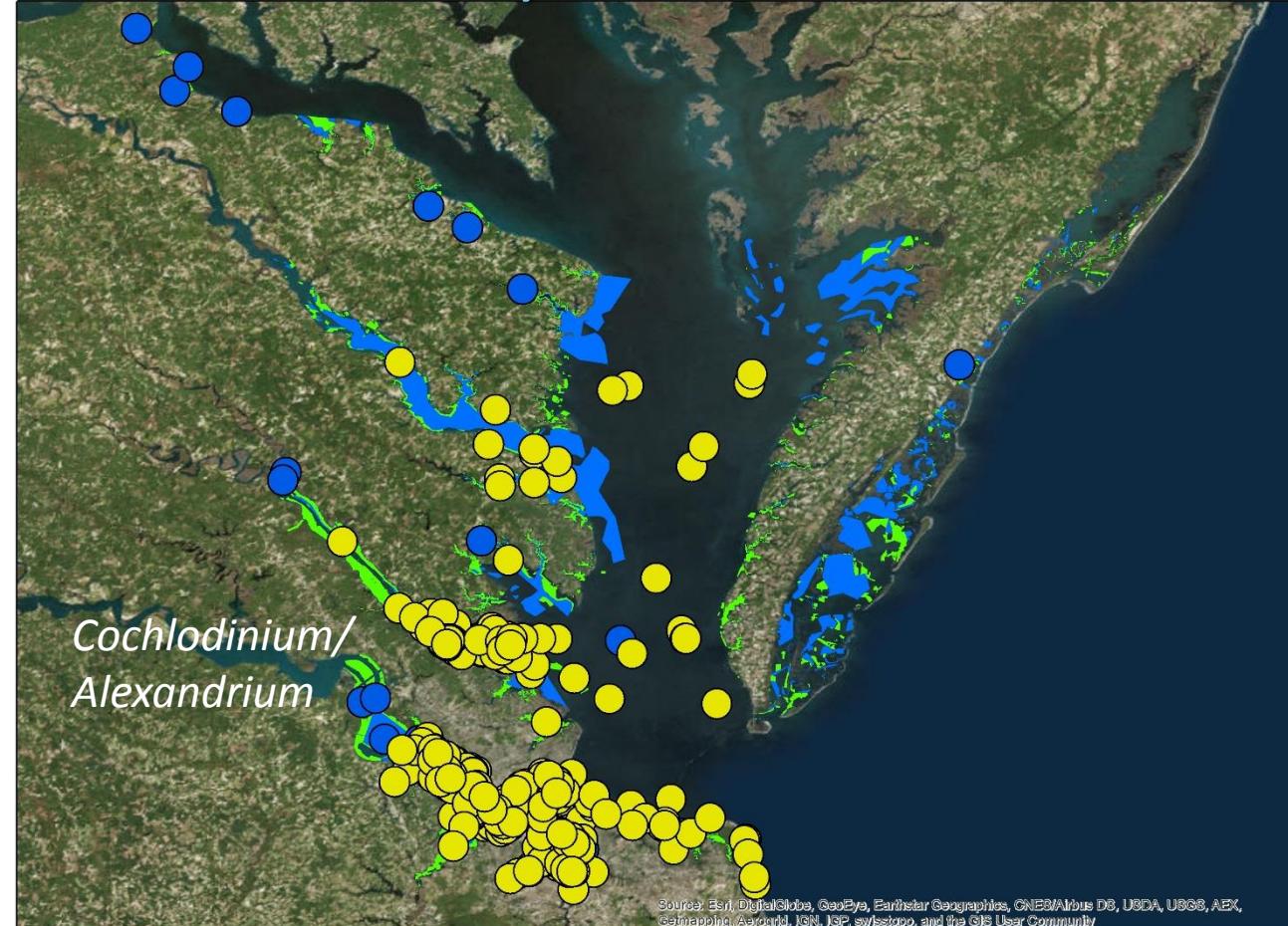


# Bloom distribution in Virginia (2007-2017)

January-June



July-December



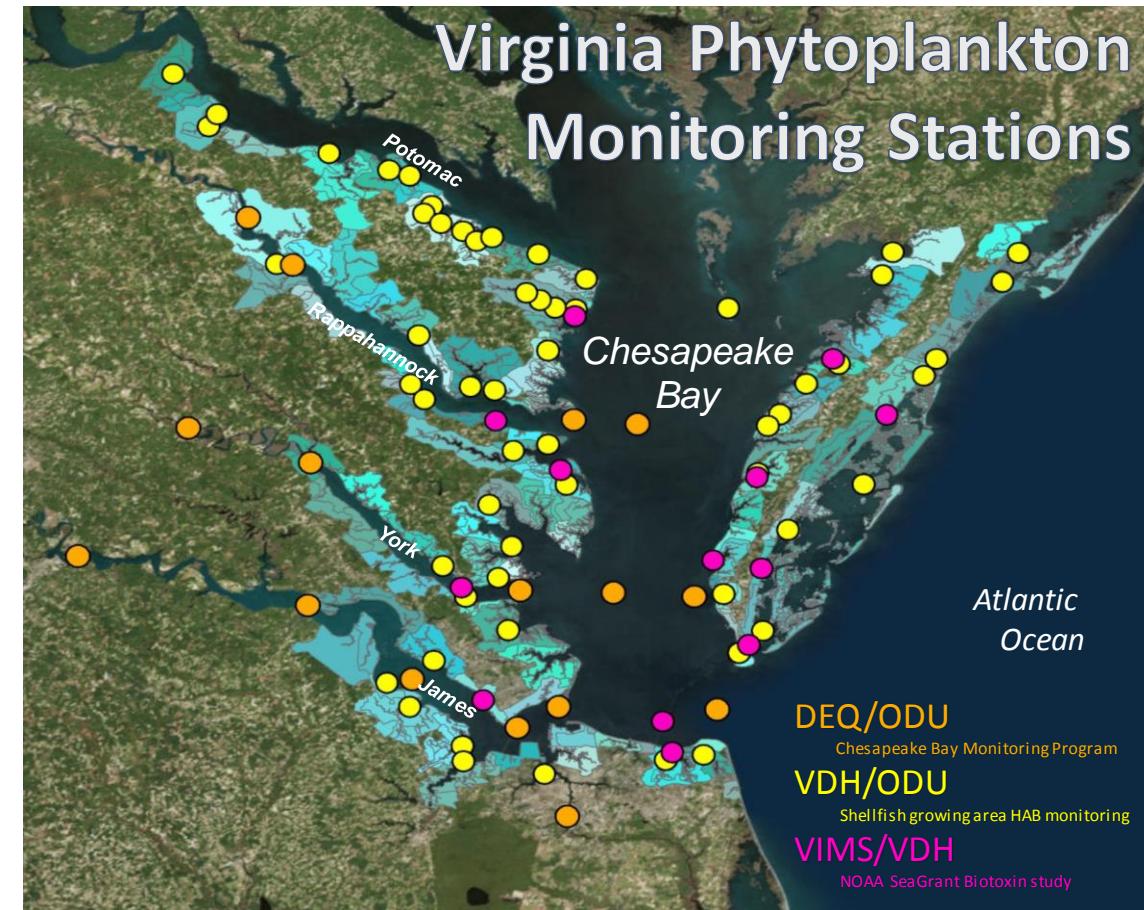
Non-HAB

Potentially toxic to fish/shellfish

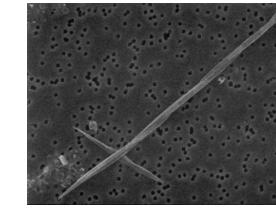
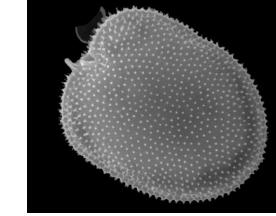
Potential shellfish toxin producers

# Monitoring

- Long-term phytoplankton monitoring
  - Chesapeake Bay Monitoring Program
  - VDH shellfish growing area HAB monitoring
- Expanding efforts
  - Molecular detection and ELISA toxin assays
  - CBTOX- (VIMS/VDH) NOAA SeaGrant toxin monitoring
    - SPATTs, LCMS-MS, toxin/phyto relationships
  - IFCB (automated continuous microscope)
  - ECOHAB –Impacts of *Alexandrium* blooms
    - Bioassays, shellfish deployments
  - Coordination with NOAA- remote sensing



# 2018 Bloom succession summary



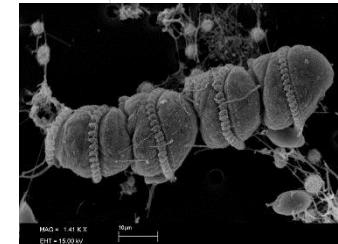
Greatly reduced bloom activity in most areas

## Winter/Spring

Heterocapsa and Prorocentrum blooms in Potomac/Northern Bay

## Summer/Fall

Cochlodinium bloom primary limited to Hampton Roads

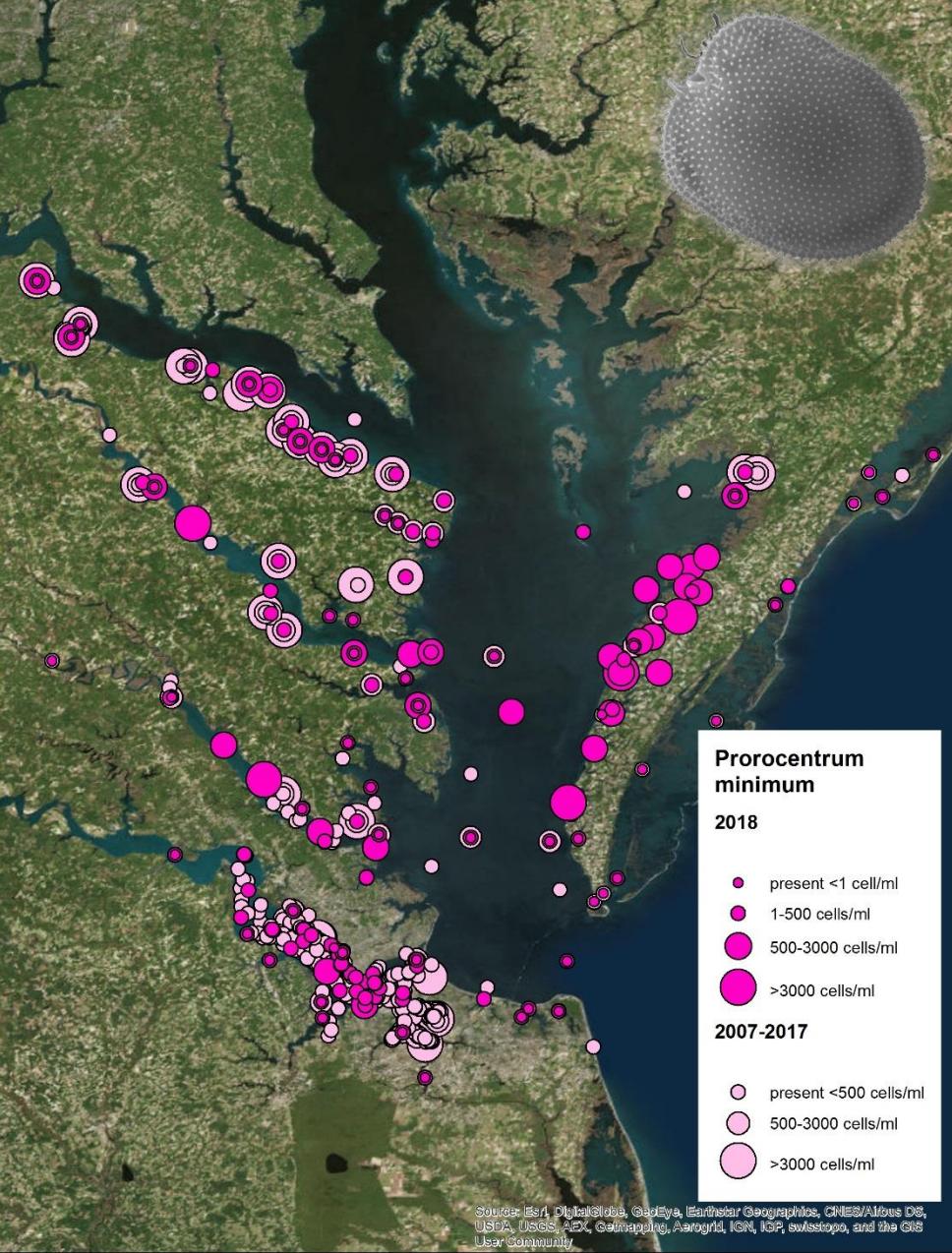
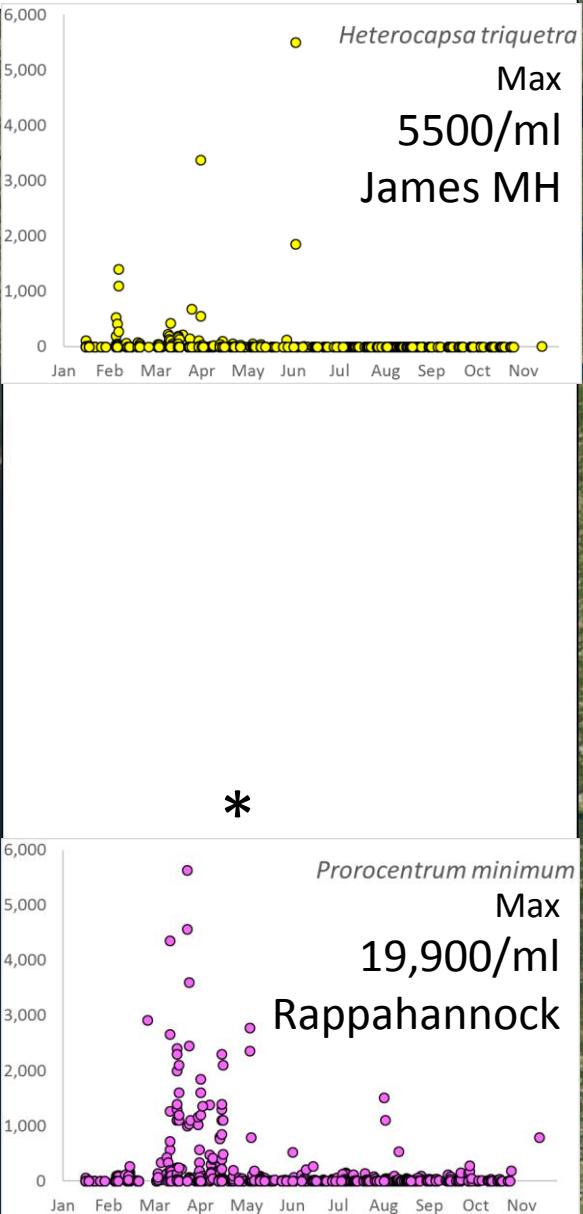
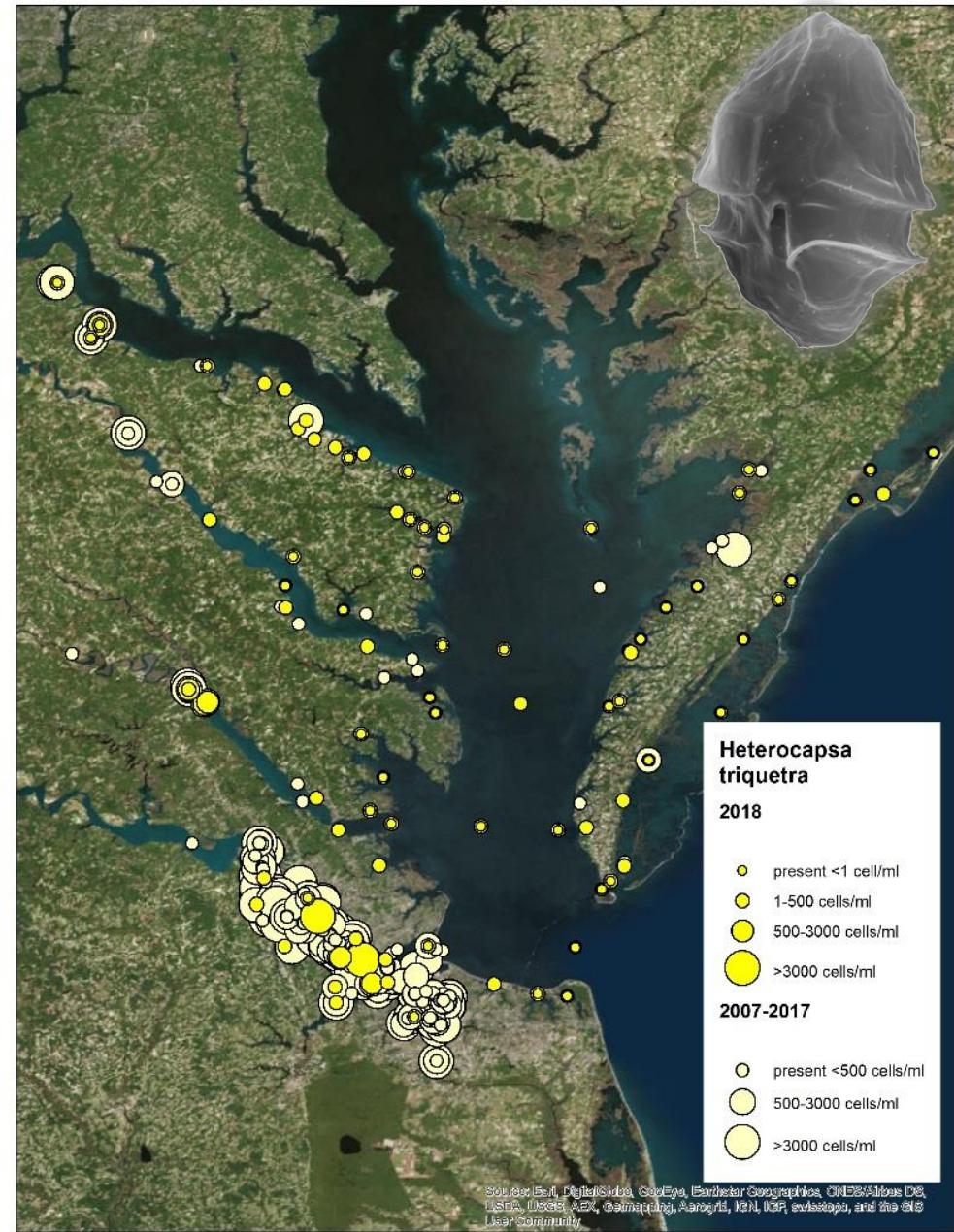


Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

## 2018 Virginia Algal Blooms

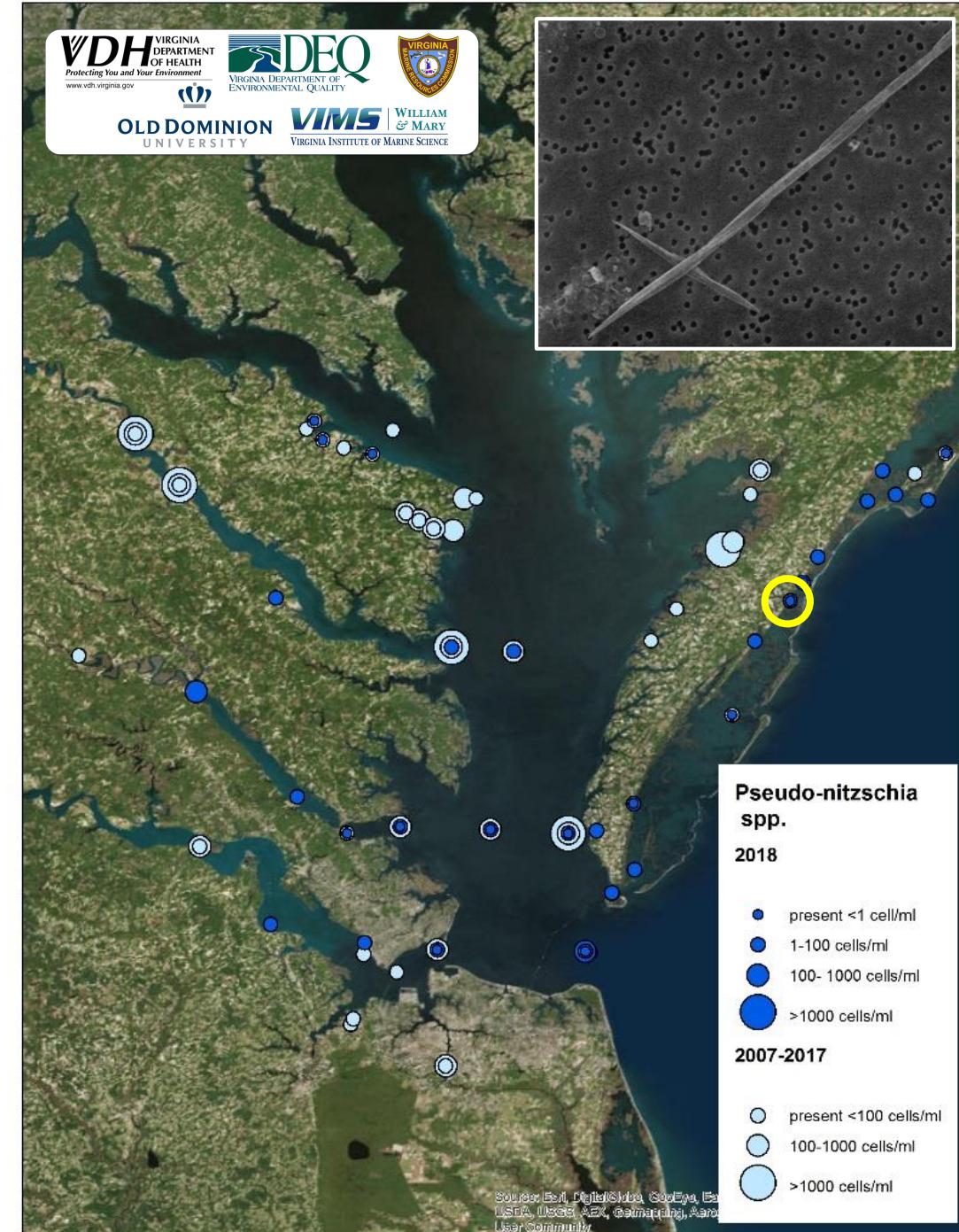
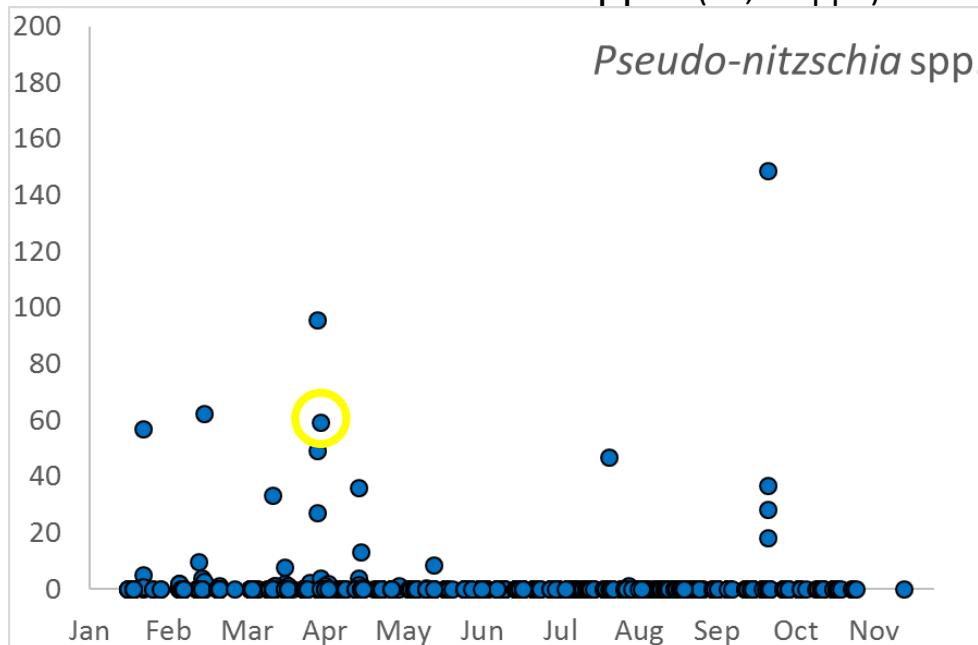
- *Heterocapsa triquetra*
- *Heterocapsa rotundata*
- *Prorocentrum minimum*
- *Dinophysis spp.*
- *Pseudonitzschia spp.*
- *Gymnodinium spp.*
- *Karlodinium veneficum*
- *Scrippsiella trochoidea*
- *Akashiwo sanguinea*
- *Cochlodinium polykrikoides*
- *Alexandrium monilatum*

# 2018 Spring blooms



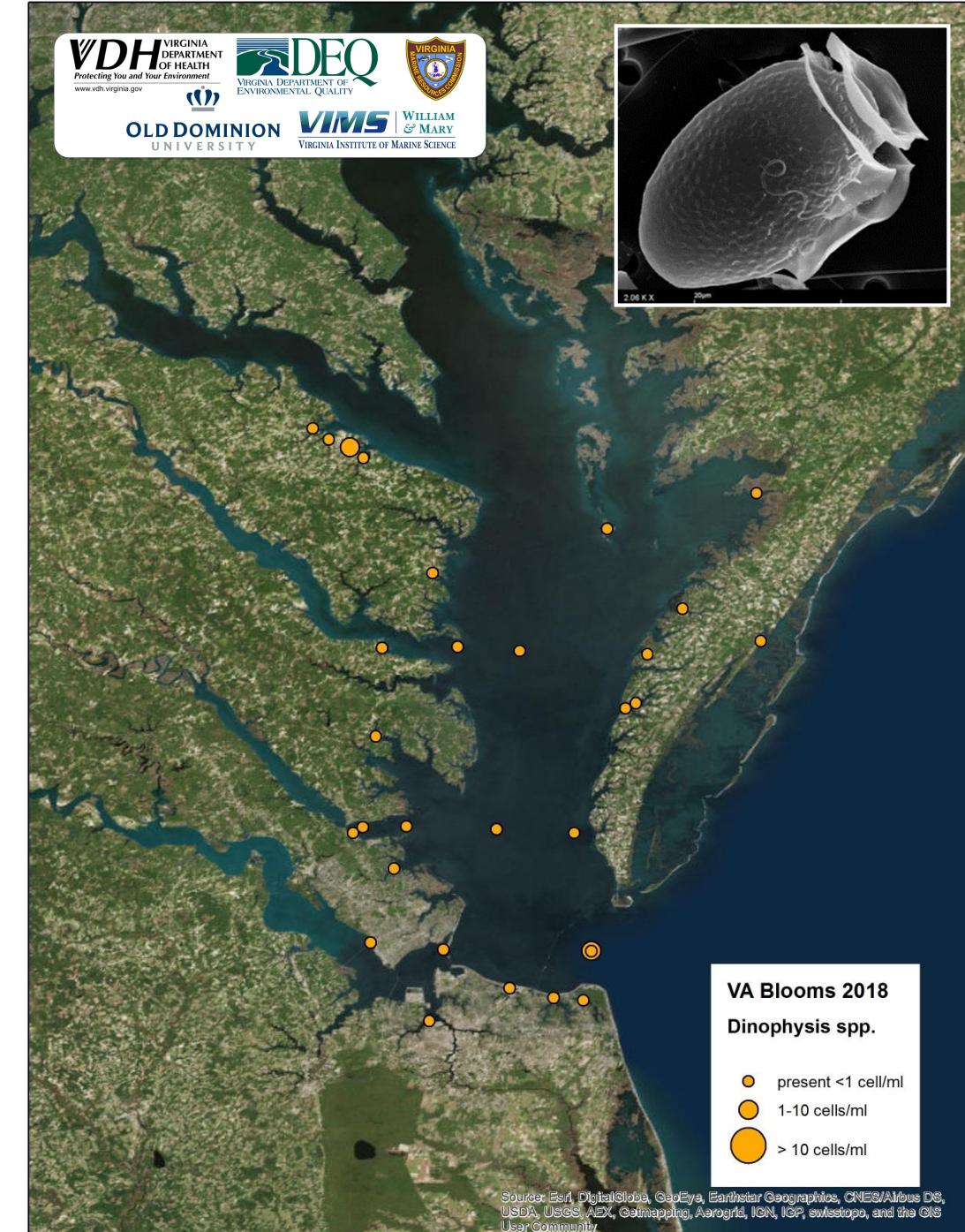
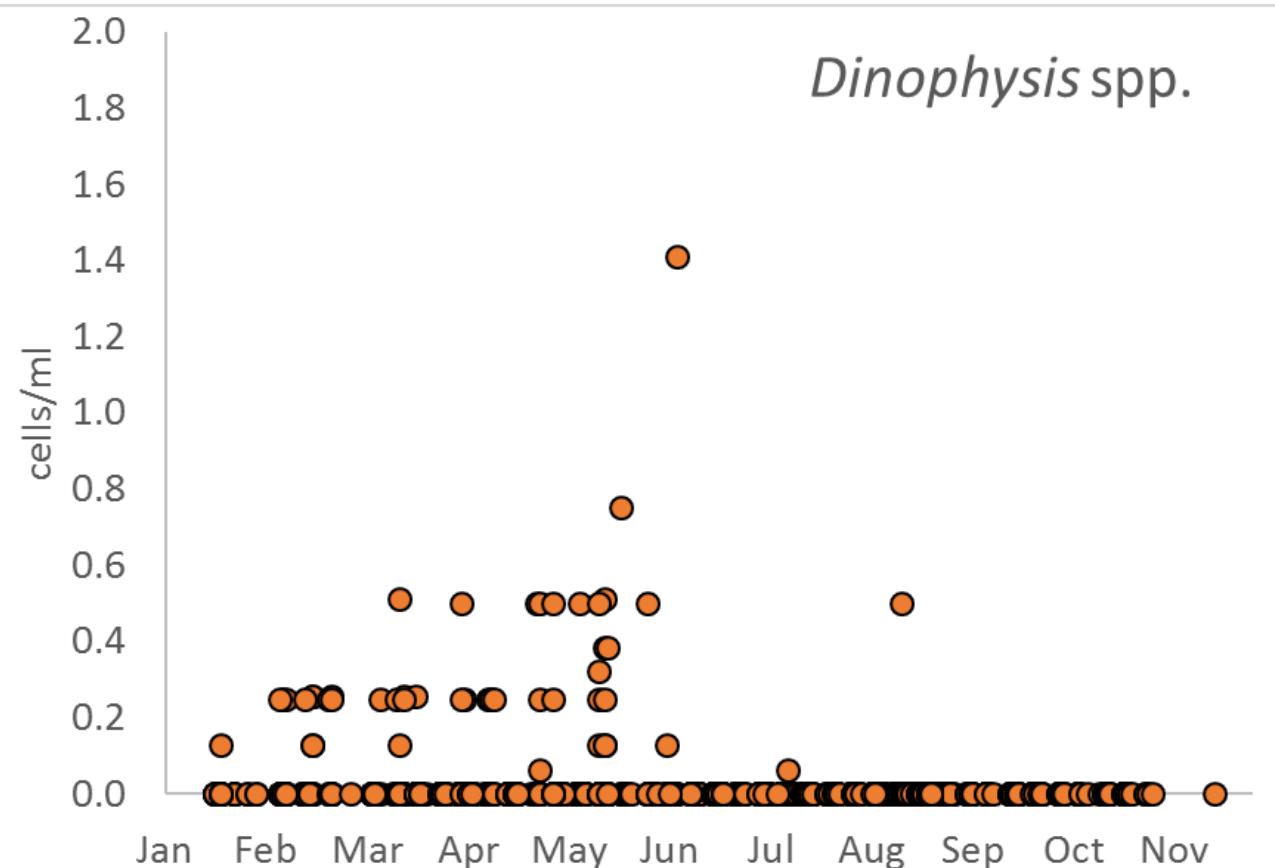
# *Pseudo-nitzschia* spp.

- Widespread distribution in Chesapeake Bay and Eastern Shore
- Generally low cell densities
- Domoic Acid below detection limit in 23/24 samples (0.5ppb)
- DA: 1.13 ppb Folly Creek
- *Pseudo-nitzschia* spp. 59/ml
  - Follow up collections of water and shellfish samples-
  - No DA in wholewater samples
  - 2-4L concentrated sieve samples, DA equivalent: 0.003-0.004ppb  
*Pseudo-nitzschia* spp. = 0.281 cells/ml
  - No detectable DA in oyster or ribbed mussel samples
    - NSSP action level: 20ppm (20,000ppb)



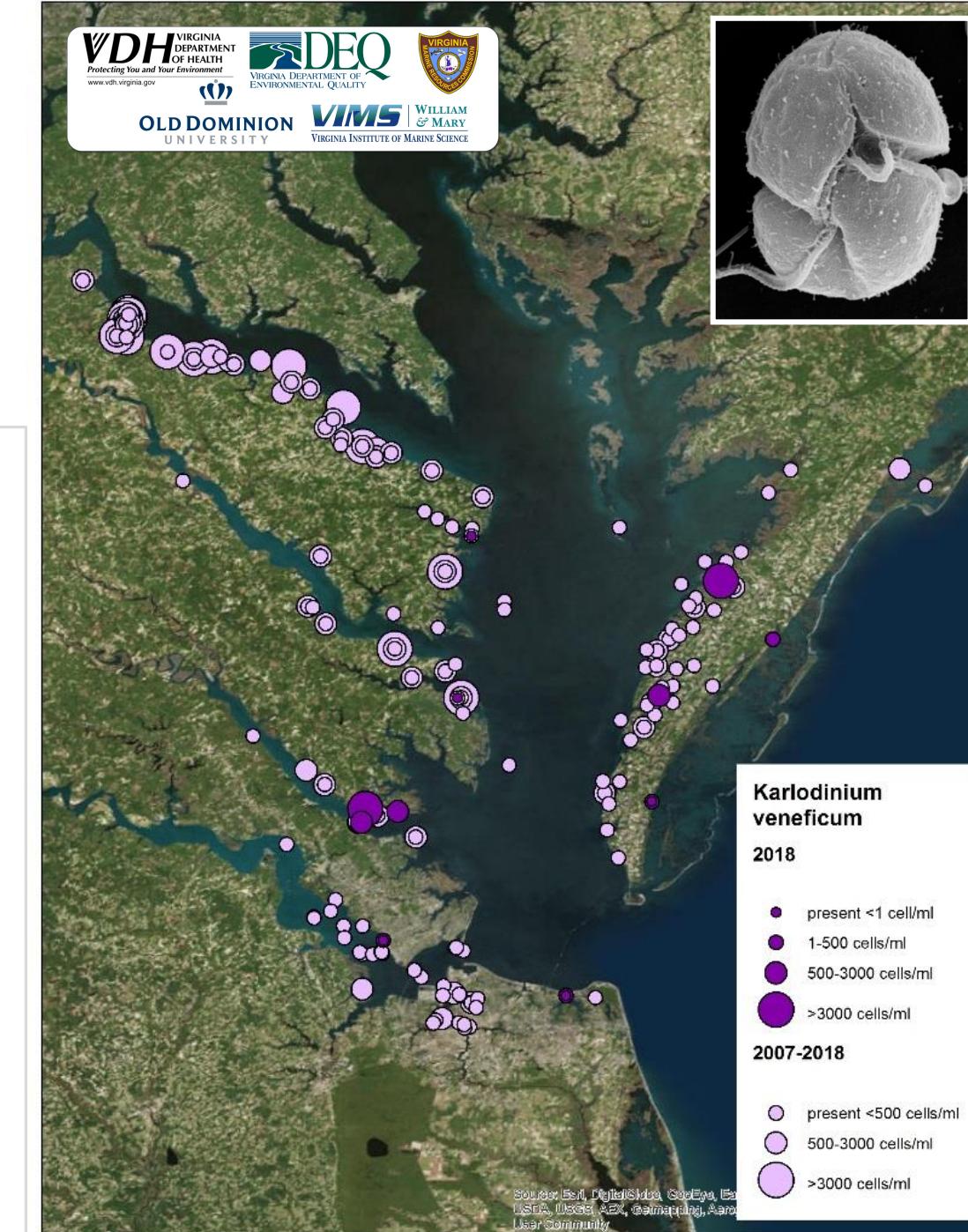
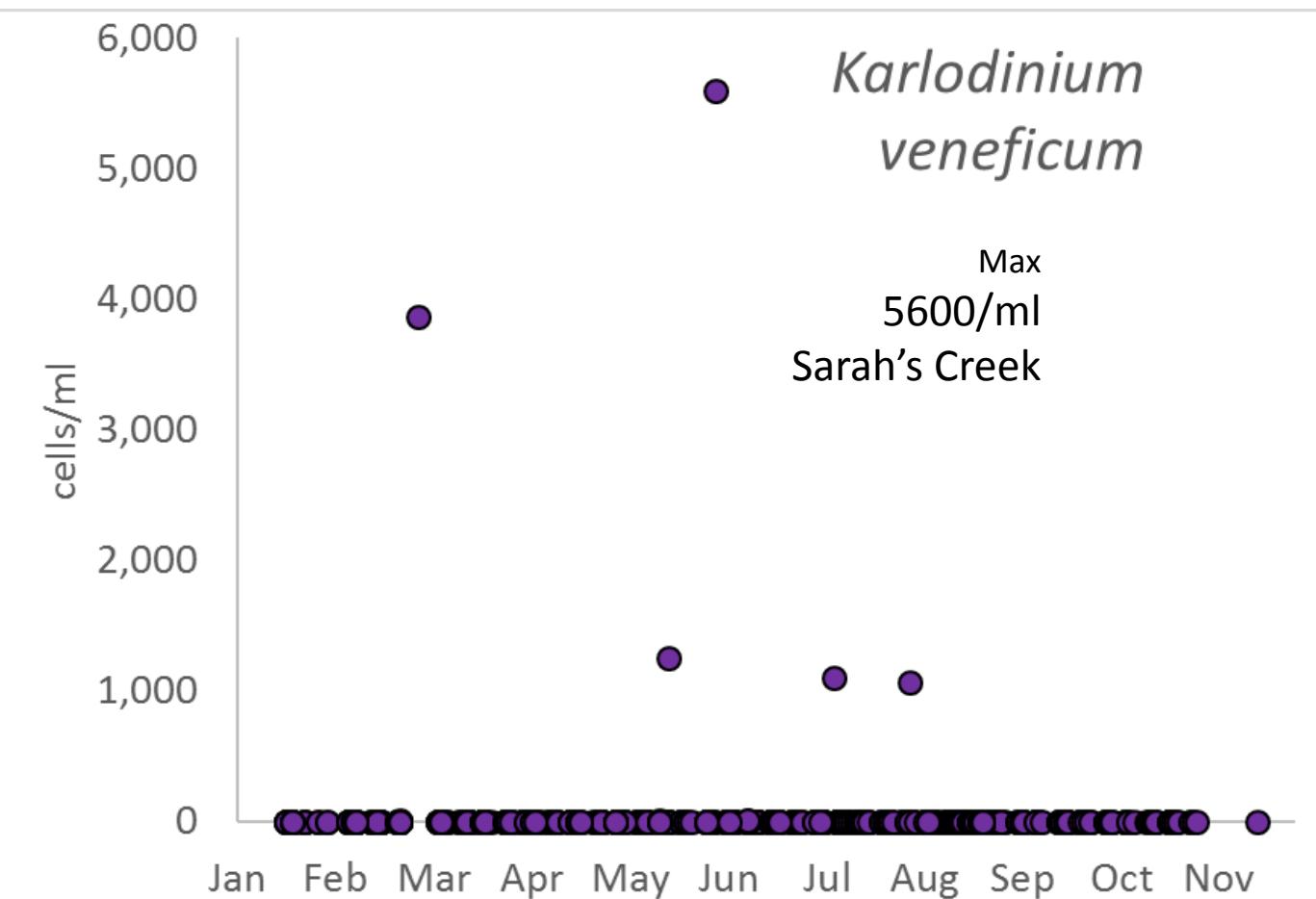
# *Dinophysis* spp.

- Widespread distribution in Chesapeake Bay and Eastern Shore
- Observed January- August
- Low cell densities (<1 cell/ml)
- Okadaic acid below detection limit (0.5 ppb, n=7/14, PP2A)



# *Karlodinium veneficum*

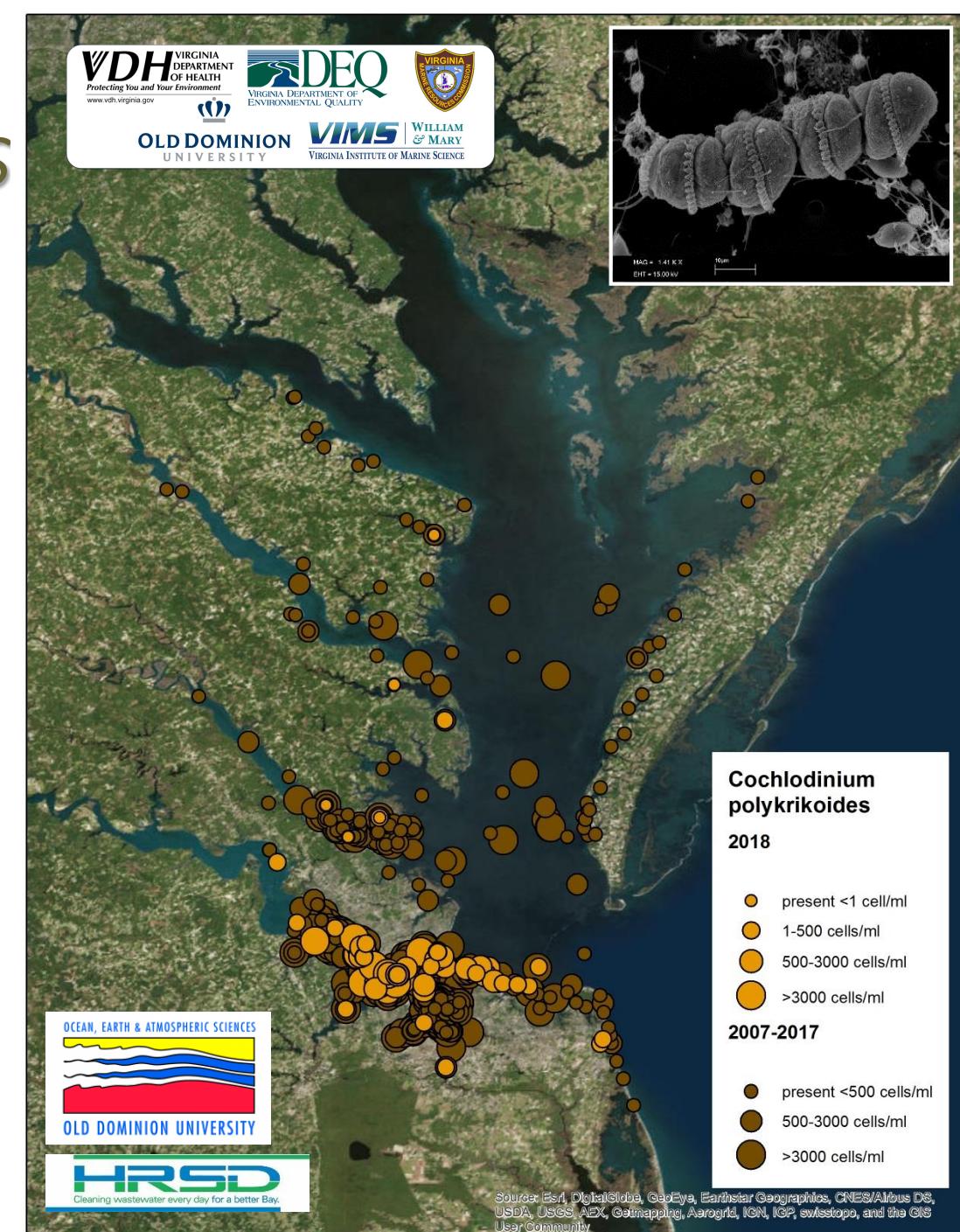
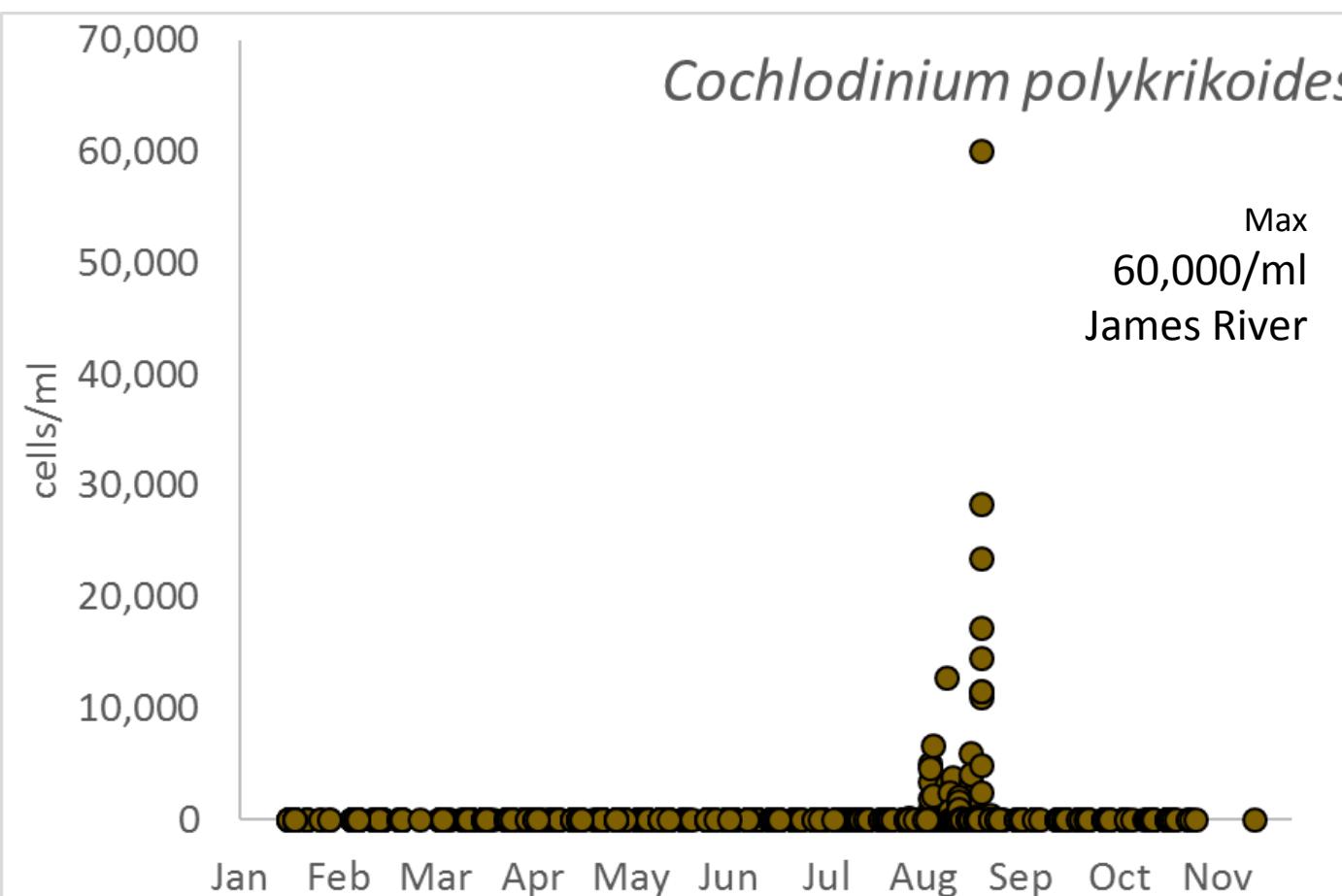
- History of regional fishkills
- No major blooms in 2018
- Lower densities than prior years



# *Cochlodinium polykrikoides*

# *Margalefidinium polykrikoides*

- James River (no sig. bloom in York)
- >1000 cells/ml 8/8 - 8/24
- >10,000 cells/ml 8/13- 8/24



# *Cochlodinium polykrikoides*



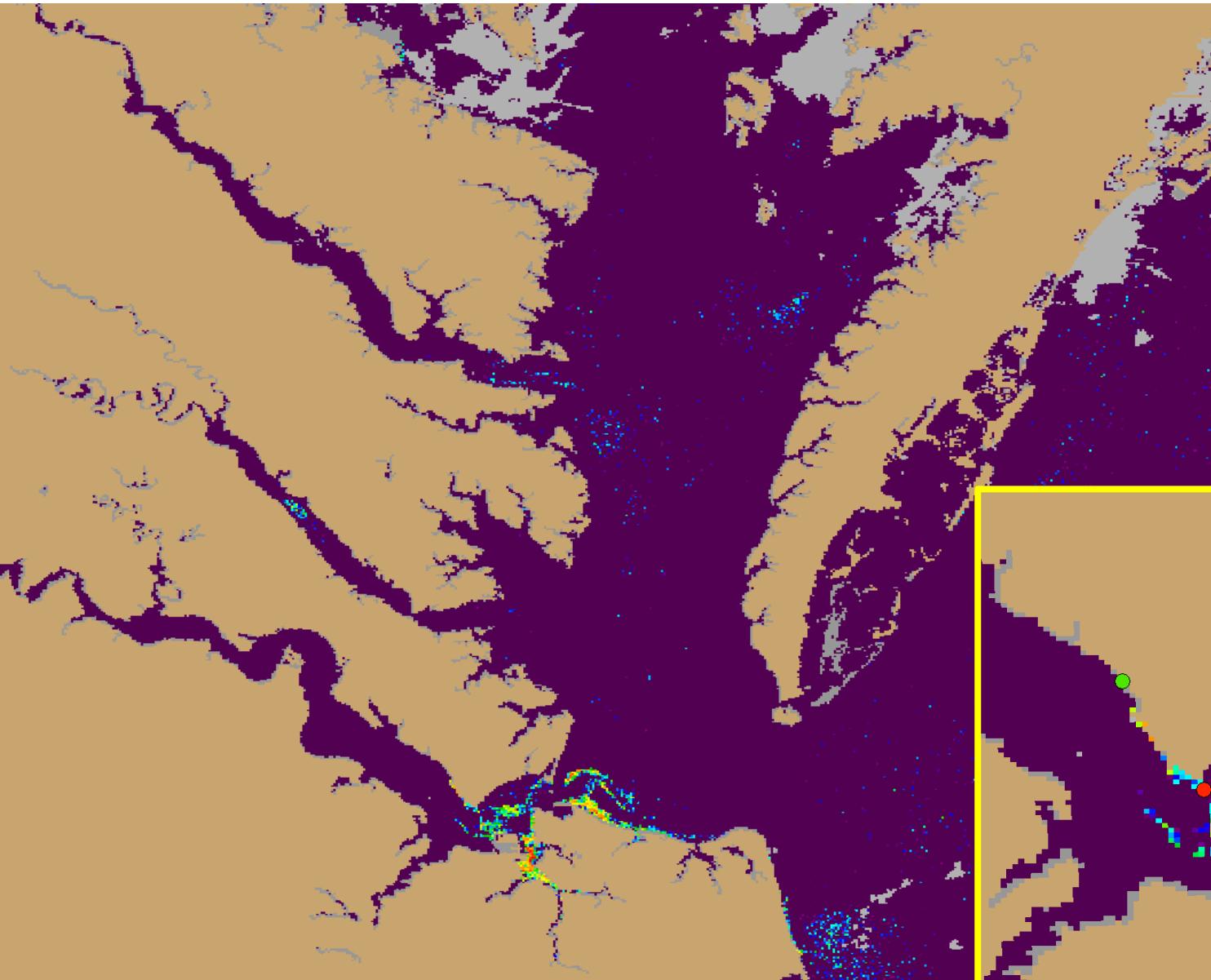
Hampton Roads Bridge Tunnel



Mouth of Lafayette River

8/23/18

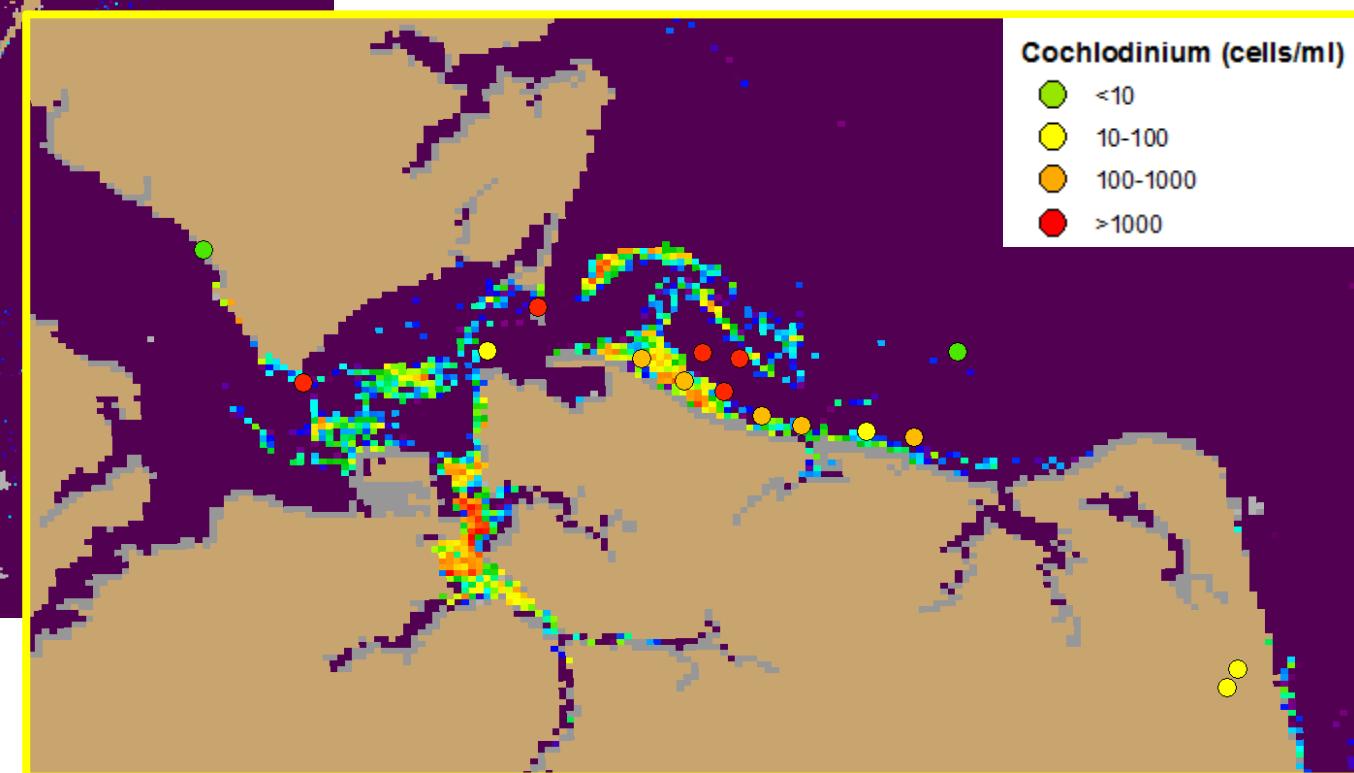
Aerial photos:  
W. Vogelbein VIMS  
Pilot: Mark Hill VMRC



# Remote Sensing

- NOAA satellite imagery
- <https://products.coastalscience.noaa.gov/hab/>
- Coordinated bloom sampling
- Spatial distribution

August 17, 2018 (rbd.tif)

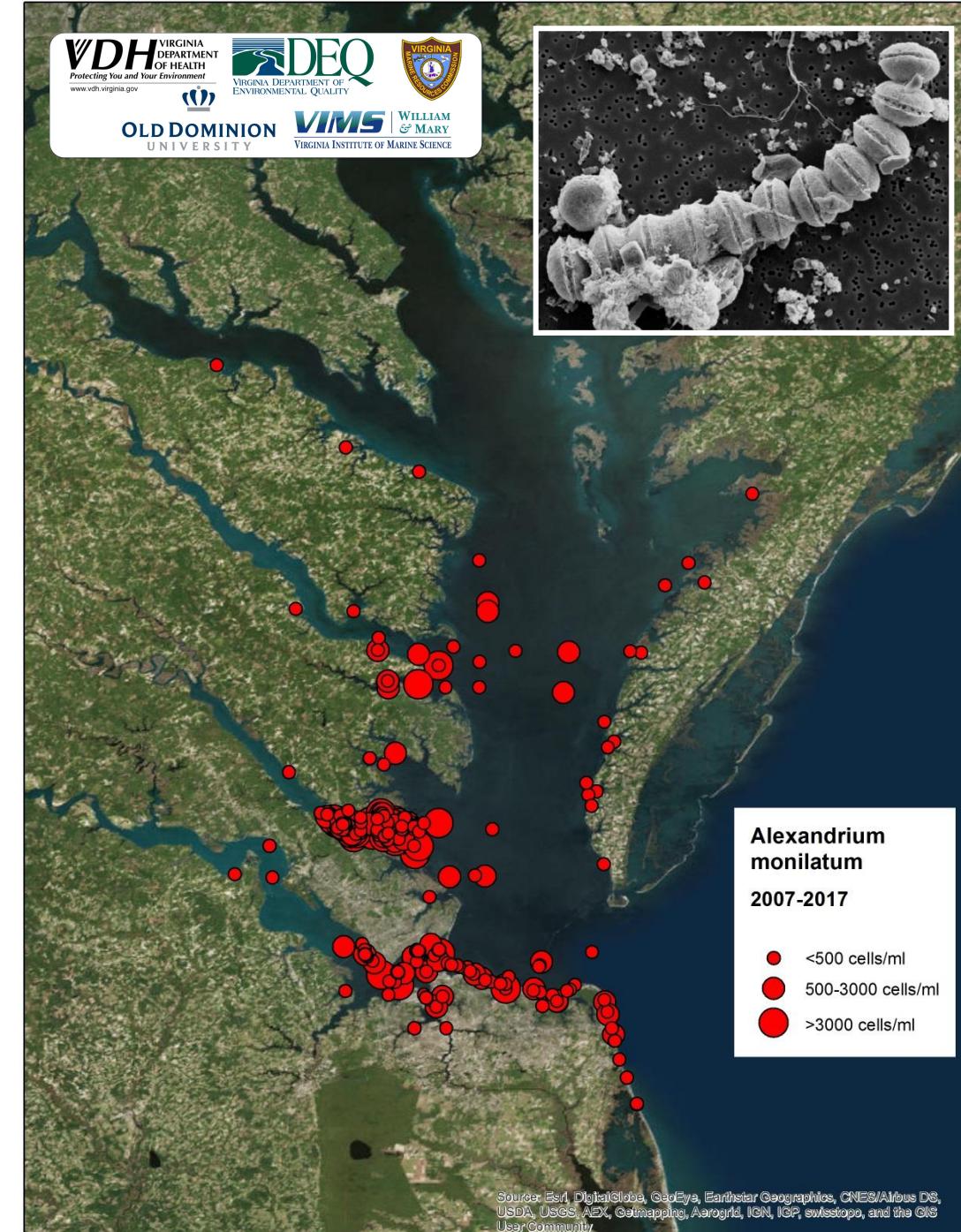
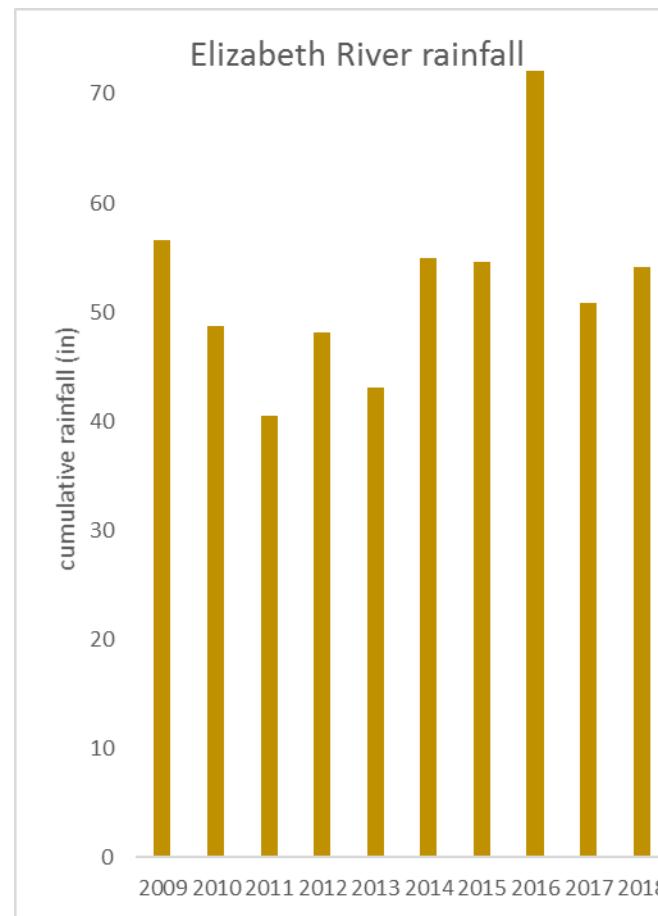
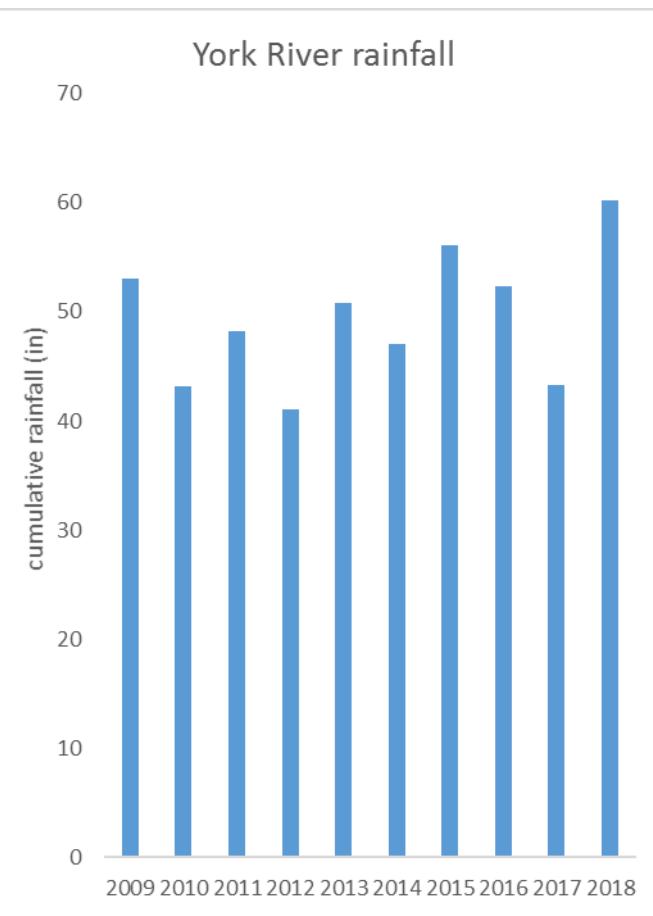


NATIONAL CENTERS FOR  
COASTAL OCEAN SCIENCE

HAB Data Explorer

# *Alexandrium monilatum*

- observed in Chesapeake Bay since 2007
- Significant blooms  
2012, 2013, 2015, 2016, 2017
- No bloom observed in 2014 or 2018



# Ongoing efforts and upcoming projects

- 2019 Revision of VDH:DSS Marine Biotoxin Control Plan  
[www.vdh.virginia.gov/shellfish](http://www.vdh.virginia.gov/shellfish)
- Expanding roles of toxin screening  
VIMS/VDH: CBTOX, VDH:DSS,  
ODU:cyanobacteria
  - Sampling 2017-2018 12 sites (w/SPATTS)
  - 2019: 4 sites, w/SPATTS and oyster deployments
- M-Bio: possible expansion of triplex toxin screening (ASP, DSP, PSP)
- [SwimHealthyVA.com](http://SwimHealthyVA.com)



todd.egerton@vdh.virginia.gov